ATTACHMENT A
SCOPE OF WORK

PART 1 – GENERAL

1. HONEYWELL will provide design engineering, drawings and specifications, construction supervision, inspection, labor, materials, tools, construction equipment, as-built drawings and other related documentation, operations and maintenance training, and subcontracted items necessary for the execution and completion of the Work.

2. The Honeywell IGA REPORT dated 07/27/15, referenced herein as Schedule A, contains scope descriptions, tables, drawings, and exhibits which further detail Honeywell's scope of work. Final design documents shall be prepared by Honeywell following contract execution and shall be submitted to CUSTOMER for review and acceptance prior to starting construction of each ESM. Final design documentation, as approved by CUSTOMER, shall take precedence over the IGA REPORT design.

3. Project contingency shall be managed by CUSTOMER outside of Honeywell's project price and applied at CUSTOMER'S sole discretion. Contingency may be used by CUSTOMER to cover project-related expenses that are not included in HONEYWELL's project price (Attachment E).

4. HONEYWELL will secure construction permits as necessary for the Work. All permit fees controlled by the Institution will be waived

5. Honeywell's scope and price are valid until November 30th, 2015 after which time Honeywell reserves the right to make adjustments to scope and pricing.

6. HONEYWELL shall complete rebate applications for the CUSTOMER providing necessary documentation as required by the Utility in the form of calculations, design documents, and forms as required for rebate applications, submit those applications on CUSTOMER'S behalf, and assist CUSTOMER in discussions and negotiations with the utility required to secure approval of rebate applications.

7. HONEYWELL shall keep the premises in an orderly fashion and clean up and remove waste materials or rubbish caused by its operations at the end of each workday, unless otherwise agreed to in writing by CUSTOMER. If HONEYWELL damages property not needed for the Work, HONEYWELL shall repair the property to its pre-existing condition unless CUSTOMER directs otherwise. At the completion of the Work, HONEYWELL shall remove any remaining waste material caused by the Work as well as all its tools, construction equipment, machinery and surplus material. Waste shall be disposed of as follows:

   (a) Construction Waste and/or Non-hazardous Waste: Construction waste (cardboard, metal, wood crates, plastic, wiring, etc.), and/or non-hazardous waste (non-PCB ballast's, lamps, batteries, etc.), shall be removed offsite by Honeywell or its subcontractors for disposal and/or recycling. The Customer's name and address shall be listed on the shipping documents as the owner/generator of the waste. The transportation of waste materials will meet local regulatory requirements.

   (b) Hazardous Waste: If and to the extent Honeywell is responsible for removal of hazardous waste pursuant to the express provisions of this Scope of Work, Honeywell or its subcontractors shall contract with a licensed transporter for the removal of the applicable hazardous waste (PCB's, mercury, asbestos, etc.). The Customer's name and address shall be listed on the shipping documents as the owner/generator of the waste. The transportation of waste materials will meet local regulatory requirements.

8. HONEYWELL shall give all notices and comply with all laws and ordinances legally enacted as of the date of execution of the Agreement governing the execution of the Work. Provided, however, that HONEYWELL shall not be responsible nor liable for the violation of any code, law or ordinance caused by CUSTOMER or existing in CUSTOMER's property prior to the commencement of the Work.

9. HONEYWELL shall comply with all applicable federal, state and municipal laws and regulations that regulate the health and safety of its workers while providing the Work, and shall take such measures as required by those laws and regulations to prevent injury and accidents to other persons on, about or adjacent to the site of the Work. It is understood and agreed, however, that HONEYWELL shall have no responsibility for elimination or abatement of health or safety hazards created or otherwise resulting from activities at the site of the Work carried on by persons not in a contractual relationship with HONEYWELL, including CUSTOMER, CUSTOMER's contractors or subcontractors, CUSTOMER's tenants or CUSTOMER's visitors. CUSTOMER agrees to cause its contractors, subcontractors and tenants to comply fully with all applicable federal, state and municipal laws and regulations governing health and safety and to comply with all reasonable requests and directions of HONEYWELL for the elimination or abatement of any such health or safety hazards at the site of the work.

10. If Honeywell encounters any materials or substances classified as toxic or hazardous in performance of the Work, including but not limited to asbestos, lead based paint or lead contaminated materials, Honeywell will notify Customer and will stop work in that area until such area has been made safe by the Customer, or Customer's Representative, at Customer's expense. In the event that such hazardous materials are encountered during the project, Customer's abatement of the materials must be executed in conformance with USEPA, HUD and other applicable regulations. CUSTOMER may elect to adjust the scope of work, deleting a portion or all of an ESM if CUSTOMER determines that the expense of remediation does not make sense economically. In the event such discovered conditions cause a delay in Honeywell's performance, Honeywell shall be entitled to request recovery of additional costs associated with such delay, as well as an extension of time of performance.
11. Where demolition of certain areas of a building are required for removal and installation of equipment and that demolition is included in the scope of work defined herein, Honeywell will make every effort to replace such areas with similar materials as available. If such materials are not available, HONEYWELL shall consult with CUSTOMER to identify materials of similar quality acceptable to CUSTOMER and such materials will be supplied and installed.
12. Honeywell shall only be responsible for repairing existing electrical wiring problems that occur within three feet (36 inches) of the device being installed or the nearest wall or ceiling penetration, whichever is smaller. Honeywell is not responsible for bringing existing lighting/electrical systems up to code. CUSTOMER may elect to delete a portion of the lighting scope of work in the event the discovery of sub-code lighting/electrical systems will result in additional costs to the CUSTOMER for remediation/repair of such conditions.
13. Honeywell shall only be responsible for repairing existing piping problems that occur within two feet (24 inches) of the device being installed or the nearest wall or ceiling penetration, whichever is smaller. Piping includes, but is not limited to, domestic hot and cold water, cooling cold water, heating hot water, condensate, fuel oil, and cooling tower condensing water.
14. Routine maintenance such as vacuuming, coil cleaning and filter change of air handling devices, etc. is the responsibility of the Customer, or as included in Attachment D.
15. If new utility meters are required, provision and coordination of utility meters is the responsibility of the customer.
16. TCP/IP: CUSTOMER is responsible for implementation and costs for remote Honeywell access through CUSTOMER's firewall(s) to the controllers and front-end computer(s) by one (1) Measurement and Verification Specialist.
17. Efficiency Values: Honeywell will install equipment and lighting components (hereto referred as "equipment") under the scope described herein with specific energy and water efficiency values. The customer is required to replace any failed "equipment" no longer warranted by Honeywell or a Honeywell subcontractor, with "equipment" of equal or greater efficiency for the full contract guarantee term.
18. The following areas are specifically excluded from this Scope of Work. Correction of problems in these areas, if required by Federal, State or local law or ordinance, will be considered additional work and will be chargeable (with approval) to the Customer.
    a. Any work not specifically stated and outlined in this Scope of Work.
    b. Painting and patching of areas beyond those areas directly related to work.
    c. Existing non-code conditions (examples: existing electrical wiring which requires correction or approval by appropriate inspectors, existing penetrations in need of fire stopping, etc).

PART 2 – PRODUCTS & EXECUTION

ESM #1: Lighting and Lighting Controls (LED)

The following table is a summary of facilities included for lighting upgrades:

LOCATION
School Facilities
JFK Middle School
Eli Whitney School
Hazardville Memorial School
Nathan Hale School
Henry Barnard School
Edgar Parkman School
Prudence Crandall School
Enfield Street School
Thomas Alcorn School
Harriet Beecher Stowe School
Head Start
Town Facilities
Emergency Medical Services
Enfield Senior Center
Pearl Street Library
Lamagna Activity Center
Enfield Town Hall
Department of Public Works
Enfield Police Department
Adult Day Care
Family Resource Center
Buildings and Grounds

Table A-1

Scope of Work

1) Honeywell shall provide equipment, materials and labor to implement the lighting retrofit, lighting controls and vending miser controls project as specified in the IGA REPORT Exhibit 5 Lighting Line by Line.
2) Post retrofit light levels shall meet or exceed IES light levels only as stated in the IGA REPORT Exhibit 12, Table 2.
3) Honeywell shall coordinate lighting retrofit activities with the customer to minimize classroom/office and school activity disruptions.
4) Honeywell shall provide for the legal and proper disposal or recycling of replaced fixtures, lamps, and ballasts.
5) Repair or replacement of fixture lenses is not included.
6) Any lighting not identified on the Lighting Line by Line is excluded. Honeywell shall provide a proposal for any work not included at the request of Customer.
7) Provide Town with 2% maintenance stock.

Warranty:

The Honeywell warranty for all lighting work operates by the Customer sending the failed material back to the manufacturer and in return new material will be provided to be installed by the Customer's work force. The lamps, ballasts, and fixtures include the following manufacturer warranties:

a) Linear LED lamps are covered by a manufacturer warranty for a period of five years.
b) Screw in PAR and A-Line LED lamps are covered by a manufacturer warranty for a period of three years.

c) LED fixtures are covered by a manufacturer warranty for a period of five years with exceptions as follows:
   1. Cree LED fixtures are covered by a manufacturer warranty for a period of ten years
   2. Relume LED fixtures are covered by a manufacturer warranty for a period of seven years
d) LED battery backup micro inverters are covered by a manufacturer warranty for a period of five years.

ESM #2: Street Lighting Upgrades

Existing Lighting Description	Existing Qty	Proposed Lighting Description	Proposed Qty
High Pressure Sodium – 1,000 W	9	LED Cobrahead – 421 W	3
		LED Flood – 421 W	6
High Pressure Sodium – 100 W	708	LED Cobrahead – 42 W	673
		LED Post Top – 25 W	35
High Pressure Sodium – 150 W	104	LED Acorn – 60 W	57
		LED Cobrahead – 53 W	43
		LED Post Top – 25 W	4
High Pressure Sodium – 250 W	667	LED Cobrahead – 101 W	649
		LED Flood – 101 W	17
		LED Post Top – 25 W	1
High Pressure Sodium – 400 W	44	LED Cobrahead – 153 W	22
		LED Flood – 171 W	22
High Pressure Sodium – 50 W	1	LED Cobrahead – 25 W	1
High Pressure Sodium – 70 W	2,150	LED Cobrahead – 25 W	2,137
		LED Post Top – 25 W	13
Metal Halide – 1,000 W	1	LED Spot Flood – 421 W	1
Metal Halide – 175 W	2	LED Cobrahead – 101 W	2
Metal Halide – 250 W	1	LED Flood – 101 W	1
Mercury Vapor – 100 W	1	LED Cobrahead – 42 W	1
Mercury Vapor – 250 W	1	LED Cobrahead – 101 W	1
Mercury Vapor – 400 W	2	LED Flood – 101 W	2

Table A-2

Scope of Work

1) Existing street lighting fixtures consist of High Pressure Sodium (HPS), Metal Halide (MH), and Mercury Vapor (MV) lamps of various wattages. These will be upgraded to high efficiency Light Emitting Diode (LED) technology as detailed in the table above.
2) Honeywell shall provide equipment, materials, and labor to implement the street lighting upgrade project as specified in the IGA REPORT Street Lighting Line by Line Exhibit 6.
3) The scope is based upon retrofit of the existing lighting poles and standards inventory provided by Enfield during the IGA REPORT. Honeywell shall perform a GPS survey of Enfield's street lights to provide a verified inventory with electronic GPS mapping and coordinated line by line. Honeywell's scope does not include repairs or replacement of existing light poles or retrofit of fixtures outside of those specified in Exhibit 6. Honeywell shall provide a proposal for any additional work identified and Customer has the option of adding to the scope of work by Change Order.
4) Provide and install up to five (5) separate mock-ups to represent the various area types (residential, commercial, industrial, public works, major intersection). Each mock-up shall include up to eight fixtures to allow for photo metric testing and design documentation which demonstrates compliance with IES standards. Pre and Post photometric testing shall be completed at each mock up location and approved by Enfield prior to the installation of remaining street lights.
5) Coordinate installation with Enfield Building Department and Department of Transportation (DOT). Provide proper Maintenance of Traffic (MOT) plans, safety work plans, signage, cones, flaggers, and protections as

required by DOT for a safe installation. Coordinate with Enfield Police Department as required, Enfield Police and other Department labor not included
6) Installations will be completed on a first shift basis, Monday - Friday.
7) Existing poles are assumed to be structurally sound, no new poles or pole repairs are included.
8) Existing street lighting wiring is assumed to be in good condition, no new wiring or wiring repairs is included.

Warranty:
The Honeywell warranty operates by the Customer sending the failed material back to the manufacturer and in return new material will be provided to be installed by the Customer's work force. The lamps, ballasts, and fixtures include the following manufacturer warranties:

a) LED Street/Area fixtures are covered by a manufacturer warranty for a period of ten years.
b) Post-top LED fixtures are covered by a manufacturer warranty for a period of five years.

ESM #3: Boiler Replacements & Pump Upgrades

Tables A-3.1 summarizes the hot water boiler replacements by building.

Building	HOT WATER BOILERS (or approved equal)							
	Boiler Make	Boiler Model	Qty	Capacity MBH	Fuel	Burner Make	Burner Model	Combustion Efficiency
Central Library	Lochinvar	KBN701	1	660	NG	Factory Mounted		91%
Town Hall	PK	C-1050	2	1,050	NG	Factory Mounted		91%
Adult Day Care	HB Smith	19A-4	1	413	#2 FO	Power Flame		83%
Eli Whitney School	PK	C-3000	1	3,000	NG	Factory Mounted		91%
Nathan Hale School	PK	C-2500	1	2,500	NG	Factory Mounted		91%
Edgar Parkman School	PK	C-3000	1	3,000	NG	Factory Mounted		91%

Table A-3.1

Scope of Work – Hot Water Boiler Replacements

1) Honeywell shall provide equipment, materials and labor to complete the hot water boiler replacement work as summarized in Table A-3.1 and further detailed on the 30% design drawings included in the IGA REPORT. Honeywell shall further develop 30% design drawings into permit-level construction documents required to secure construction permits through Enfield Building Department.
2) Disconnect piping, wiring and control connection to the existing hot water boilers
3) Demolish and legally dispose of existing boilers
4) Furnish and install new boilers and burners, complete with factory-installed BACnet controllers, as shown in table above for each location.
5) Furnish and install power wiring and reconnection of existing control wiring
6) Furnish and install new boiler combustion and exhaust piping for each new condensing boiler plant
7) Extend existing concrete housekeeping pads as required
8) Furnish and install new hot water piping headers and valves as required
9) Reconnect gas and oil piping as applicable
10) Customer is responsible to coordinate and install new gas utility, at Customer expense, with new service meter adjacent to existing boiler room outside wall. Utility is responsible to install meter pad, protective bollard, fencing as required at Customer expense.
11) At Central Library, furnish and install required natural gas piping from new utility installed service to the boiler room
12) Install new boiler exhaust flue for each new condensing boiler plant
13) Adult Day Care chimney will be inspected and cleaned as required during construction
14) Insulation of new piping and insulation on adjacent piping damaged during construction
15) Rigging
16) Startup, test and commission – startup to be performed by factory rep or factory certified technician.
17) Training of facility staff of operation of new boilers

18) Any equipment not shown on the IGA REPORT 30% design drawings for all buildings other than Nathan Hale School and Edgar Parkman School is excluded. For Nathan Hale School and Edgar Parkman School, only the equipment listed above in Table A-3.1 is included. At the request of the Customer Honeywell shall provide a proposal to add any work not included.

Table A-3.2 is a listing of pumps and motors identified for replacement.

Building	PUMP/MOTOR UPGRADES		
	Equipment	Qty	Motor HP Each
Town Hall	CHW Pump 2	1	2.0
Town Hall	CHW Pump 3	1	2.0
Town Hall	CHW Pump 5	1	2.0
Town Hall	HW Pump 4	1	2.0
Town Hall	HW Pump 6	1	2.0
Eli Whitney School	HW Pumps 1 & 2	2	5.0
Central Library*	HW Pump 2 & 2A	2	0.5

Table A-3.2

*Note, these are new pumps serving the hot water reheats installed under ESM 4 detailed below

Scope of Work – Pump Upgrades

1) Honeywell shall provide equipment, materials and labor to complete the pump upgrade work as summarized in Table A-3.2 and further detailed on the 30% design drawings included in the IGA REPORT. Honeywell shall further develop 30% design drawings into permit-level construction documents required to secure construction permits through Enfield Building Department.
2) Disconnect piping, power and control wiring from existing pumps and motors
3) Remove and dispose of existing pumps and motors
4) Furnish and install new pumps with NEMA Premium efficiency motors as listed in the table above
5) Reconnect piping, power and control wiring to new pumps and motors
6) Align couplings to EASA standards
7) Any equipment not shown on the IGA REPORT 30% design drawings is excluded. At the request of Customer, Honeywell shall provide a proposal for any work not included.
8) Measure and verify the pre and post-retrofit voltage, amperage, and revolutions per minute (RPM).
9) Training of facility staff of operation of new equipment.

Table A-3.3 is a listing of steam boilers identified for replacement.

Building	STEAM BOILERS (or approved equal)							
	Boiler Make	Boiler Model	Qty	Capacity MBH	Fuel	Burner Make	Burner Model	Combustion Efficiency
Enfield Street School	HB Smith	28A-S-11	2	2,146	Dual	Power Flame		83%

Table A3.3

Scope of Work – Steam Boiler Replacements

1) Honeywell shall provide equipment, materials and labor to complete the steam boiler replacement work as summarized in Table A-3.2. Honeywell shall develop permit-level construction documents required to secure construction permits through Enfield Building Department.
2) Disconnect all piping, wiring, and control connection to the existing steam boilers listed in the Table 3.3 above.
3) Demolish and legally dispose of existing boilers.
4) Furnish and install boilers and burners as shown in Table 4-3.5 above for each location.
5) Furnish and install power wiring and reconnection of existing control wiring.
6) Extend existing concrete housekeeping pads as required.
7) Furnish and install new boiler feedwater tank and condensate receiver
8) Furnish and install new steam piping headers and valves as required
9) Reconnect gas and oil piping.

10) Insulation of new piping and insulation on adjacent piping damaged during construction
11) Rigging
12) Startup, test and commission – startup to be performed by factory rep or factory certified technician
13) Training of facility staff of operation of new boilers
14) At Customer's request, Honeywell shall provide a proposal for any work not included.

ESM #4: Replace Multi-Zone AHU & Cooling System

CENTRAL LIBRARY – UNIT DATA (or approved equal)	
Make:	Daikin
Model:	RPS050D
Voltage:	460/60/3
AHRI 360 Standard Efficiency:	9.8 EER / 14.6 IEER
ASHRAE 90.1:	2013 Compliant
Heat Type:	Natural Gas
Hot Gas Reheat:	Factory Mounted, Blow Thru
Condenser Type:	Air Cooled
Features	
0-100% Economizer with OA Dry Bulb & Enthalpy Control	
30% Nominal Efficiency, MERV 8 Filters	
Variable Volume Operation with VFD	
Cooling Coil	
Total Capacity:	613,656 BTUh
Sensible Capacity:	411,431 BTUh
Refrigerant Type:	R410A
Face Area:	39.5 square feet
Natural Gas Heat Section	
Heat Exchanger Material:	Type 321 Stainless Steel
Input:	1,000 MBH
Output:	800 MBH
Steady State Efficiency:	80%
Supply Fan	
Capacity:	14,000 CFM
Motor Size (ODP):	10.0 HP
Motor Efficiency:	91.7%
Condensing Section	
Compressors – 4 Total	18.6 FLA Each / 40.5 Total kW
Condenser Fans – 4 Total	2.1 Amps Each

Table A-4

Scope of Work

1) Honeywell shall provide equipment, materials and labor to complete the multi-zone AHU and cooling replacement work as summarized in Table A-4.1 and further detailed on the IGA REPORT 30% design drawings. Honeywell shall further develop 30% design drawings into permit-level construction documents required to secure construction permits through Enfield Building Department.
2) Disconnect ductwork, piping, wiring and control connections to the existing multi-zone AHU
3) Remove and dispose of existing multi-zone AHU, and chiller/cooling tower system
4) Furnish and install a new natural gas fired, variable volume AHU equipped with packaged DX cooling coil and air cooled condenser section on grade
5) Furnish and install ductwork down to the boiler room to connect to existing zone ducts

6) Furnish and install reheat piping and associated piping insulation as required
7) Furnish and install five (5) variable air volume boxes with reheat coils and insulated piping to serve existing zones
8) Furnish and install load-side natural gas piping as required from new service implemented by utility under ESM #3.
9) Furnish and install insulation on adjacent ductwork and piping damaged during construction
10) Furnish and install new control and power wiring as needed to reconnect
11) Provide necessary air and water balancing for newly installed equipment
12) Furnish and install fencing around new unit on grade as required
13) Any equipment not shown on the IGA REPORT 30% design drawings is excluded. Honeywell shall provide a proposal for any work not included at the request of Customer.
14) Start up and commissioning
15) Training of facility staff of operation of new equipment

Notes:
a) Packaged variable speed pumps with 2-way VAV reheat coils will be considered as an option during final design.
b) New piping and ductwork will be fully insulated as required
c) An equivalent unit manufactured by Trane is also being considered during final design

ESM #5: Building Management System Upgrades

Honeywell shall provide necessary equipment, materials, and labor to implement the following building management systems upgrades.

Building	Existing Building Management System	Integration Method
Enfield Town Hall	None	Town LAN
Family Resource Center	None	Town LAN
Adult Day Care	None	Town LAN
Head Start	Invensys	School LAN
Lamagna Activity Center	None	Town LAN
Central Library	None	Town LAN
Enfield Senior Center	Carrier	Town LAN
Department of Public Works	None	Town LAN
Hazardville Memorial School	Invensys	School LAN
Enfield Street School	Invensys	School LAN
Thomas Alcorn School	Invensys	School LAN
Harriet Beecher Stowe School	Invensys	School LAN
Henry Barnard School	Invensys	School LAN
Eli Whitney School	Invensys	School LAN
Prudence Crandall School	Invensys	School LAN
Nathan Hale School	Invensys	School LAN
Edgar Parkman School	Invensys	School LAN

Table A-5

Scope of Work
1) Honeywell shall furnish one (1) laptop with proper Building Management System software for remote login capabilities. Honeywell is responsible for coordinating with town and school IT departments to setup remote connection.
2) The Town of Enfield shall be responsible to ensure buildings, as listed in Table A-5, are connected on the appropriate LAN for communication with the Building Management System.

3) The Town of Enfield shall be responsible to provide and terminate new LAN connections in each building, as listed in Table A-5, which will be used to connect a new Invensys web controller for integration to the energy management system.
4) The Town of Enfield shall provide VPN access to Honeywell for remote access into the Building Management System for M&V and service functions.
5) Where specified in the scope of work, Honeywell will furnish and install Invensys Building Management System including Direct Digital Controls (DDC) panels, sensors, thermostats, wiring, control valves, and actuators as needed for a complete installation as described herein. Existing control panels, enclosures, and raceways shall be reused where possible.
6) Existing valves called to be retrofit are assumed to be compatible with DDC actuators, except where the scope calls to replace the existing valve.
7) Upgrade and integration of existing systems specified includes point to point check out and checkout of existing control sequences. Honeywell shall develop a deficiency list during commissioning and checkout and shall provide a proposal to Customer to correct any deficiencies identified.
8) Hydronic sensors shall be strap-on type.
9) Implement control sequence parameters and set points as specified in the IGA REPORT.
10) Wiring shall be concealed to the extent possible during installation. If wire mold is used it shall match existing.
11) Where specified in the scope of work, existing pneumatics shall be disconnected and capped to prevent any air leaks. Disconnected and unused pneumatic devices shall be removed and discarded. Unused compressed air lines will be removed where accessible. Repair or replacement of existing pneumatic control systems are not included unless specified.
12) Thermostat and sensor covers, cages, protections not included unless specified.
13) Existing wall thermostats will be abandoned in place. Painting and patching of walls thermostat replacements, etc. is not included.
14) Temporary removal of existing cabinetry, furniture, occupant materials by town
15) Testing, adjusting, balancing (TAB) is only included where specified in the scopes of work.
16) Providing and installing smoke or fire alarm equipment is excluded. Existing smoke and fire alarm equipment will remain untouched.
17) Any equipment not specifically stated as included for retrofit, repair or replacement is excluded. At the request of Customer, Honeywell shall provide a proposal for any work not included.
18) Training for the new Building Management System includes on-site training that will be led by a training director and will be provided with appropriate learning material. It is anticipated there will be two separate site visits, one upon completion of project, then the second six months later. Completion of follow up training shall not delay substantial completion.

Enfield Town Hall – Scope of Work

1) Fan Coil Units (FCU):
   Provide Direct Digital Control of the existing thirty-seven (37) FCUs. Provide space temperature and night setback control.

   - Analog Input (AI)
   - Analog Output (AO)
   - Digital Input (DI)
   - Digital Output (DO)

Fan Coil Unit	AI	AO	DI	DO
Fan S/S				37
Fan Status				37
Hot Water Valve Actuator		37		
Chilled Water Valve Actuator		37		
Supply Air Temperature	37			
Space Temperature	37			

Honeywell Shall Implement:

- Install new sensors and Direct Digital Control valves – Two (2) new 2-way DDC valves with actuators will be provided for each FCU. Isolation valves are excluded; two (2) feet on either side of the control valve and the addition of a union (if not currently available) is included.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.
- Note, each thermostat will have adjustable setpoints that can be modified by the occupant within the given range

2) Occupancy Sensor for FCU Control:

Provide and install an occupancy sensor in the ground floor conference room and in the first floor Council Chambers to control the FCUs.

FCU	AI	AO	DI	DO
Conference Room Occupancy Sensor			1	
Council Chambers Occupancy Sensor			1	

Honeywell Shall Implement:

- Install new occupancy sensors.
- Occupied/Unoccupied control based on room occupancy.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Electric Baseboard:

Provide Direct Digital Control of the six (6) sections of electric baseboard radiation in the town attorney's office. Take control and provide night setback by controlling the three circuit breakers in the storage closet. The existing line-voltage thermostats will remain in control during the occupied hours.

Electric Baseboard	AI	AO	DI	DO
On/Off Relay				3

Honeywell Shall Implement:

- Install new contactors to enable/disable electric baseboard circuits.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Cabinet Unit Heater:

Provide temperature and night setback control of the cabinet unit heater in the entrance way.

Cabinet Unit Heater	AI	AO	DI	DO
Fan S/S				1
Fan Status			1	
Heating Valve		1		
Space Temperature	1			

Honeywell Shall Implement:

- Install new sensors and control existing valve.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.
- Note, each thermostat will have adjustable setpoints that can be modified by the occupant within the given range

5) H&V Units in Attic:

Provide Direct Digital Control of the two (2) H&V units in the attic area. Provide SAT reset, HW valve control, DCV control, (1) electric preheat coil, (3) electric reheat coils, unit off during morning warm-up, and occ scheduling.

H&V Unit	AI	AO	DI	DO
Fan S/S				2
Fan Status			2	
OA/RA Damper		2		
Hot Water Heating Coil		2		
Discharge Air Temperature (DAT)	2			
Electric Preheat Coil				1
Electric Reheat Coil				3
CO2 Sensor	2			
Mixed Air Temperature	2			
Supply Air Temperature	4			
Space Temperature	4			

Honeywell Shall Implement:

- Provide DAT control, economizer control, MAT control, DCV, and reheat coil control.
- Reuse existing valves. Provide new damper actuators and commission OA dampers.
- Retain all existing H&V safety interlocks.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Exhaust Fans:

Provide Building Management System start/stop control and status of three (3) exhaust fans in the attic.

Exhaust Fan	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement:

- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Boiler Control:

Provide Building Management System on the two (2) new boilers and two (2) existing pumps listed below. The new boilers will be furnished with BACnet communication cards to allow full integration of the boiler points into the existing Building Management System. The boilers shall operate as stand-alone equipment. The in-line circulating pumps on each boiler and combustion air dampers will be interlocked to the internal boiler controls and will not require Building Management System.

Points shown in the table below are new points, wiring and sensors by Building Management System contractor.

Boiler Control	AI	AO	DI	DO
New Boiler Enable/Disable (via BACnet)				2
New Boiler Hot Water Supply Temp (via BACnet)	2			
New Boiler Hot Water Return Temp (via BACnet)	2			
New Boiler Alarm (via BACnet)			2	
New Boiler Hot Water Reset Signal (via BACnet)		3		
Outside Air Temperature	1			

Boiler Control	AI	AO	DI	DO
Common Hot Water Supply Temp (hard-wired)	1			
Common Hot Water Return Temp (hard-wired)	1			
Existing Hot Water Pumps Start/Stop (hard-wired)				2
Existing & New Hot Water Pumps Status (hard-wired)			4	

Honeywell Shall Implement:

- Hot water reset schedule based on Outdoor Air Temperature (OAT).
- OAT boiler lockout.
- Pump lead/lag control.
- Condenser boiler staging will be controlled by the internal boiler controls via a master/slave setup provided by the factory.
- Honeywell shall run the BACnet communication wiring to the boilers and terminate the wires. It's Honeywell's responsibility to coordinate all interface work with the factory boiler startup representative to resolve all communication issues.
- Graphics for boilers and pumps showing proper points and associating alarm points with their respective graphic pages.

8) Hot Water Pump Bypass Valves:

Provide Building Management System of the two (2) 2-way bypass valves on each hot water pump loop. Provide necessary differential pressure (DP) sensors to provide control.

Boiler Control	AI	AO	DI	DO
Valve Actuator		2		
DP Sensor	2			

Honeywell Shall Implement:

- Differential pressure control of HW system.
- Graphics for units showing proper points, setpoints, and associating alarm points with their respective graphic pages.
- Note, the installation of packaged variable speed pumps will be considered during final design.

9) Chiller Control:

Provide Building Management System of the one (1) existing chiller and three (3) chilled water pumps (S/S, status, chiller alarm, CHWS & CHWR temp, etc).

Chiller Control	AI	AO	DI	DO
Chiller Enable/Disable				1
Chiller Status			1	
Chiller Alarm			1	
Chilled Water Pump S/S				3
Chilled Water Pump Status			3	
CHWS	1			
CHWR	1			

Honeywell Shall Implement:

- Enable/disable control of the chiller based on outside air lockout setpoint.
- Chilled water available signal to all associated cooling equipment.
- Graphics for units showing proper points, setpoints, and associating alarm points with their respective graphic pages.

Family Resource Center – Scope of Work

1) Wireless Web-Connected Thermostat RTUs:
Replace the two existing RTU stats with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT. The thermostats and trend data shall be available via a password protected website.

RTU	AI	AO	DI	DO
Space Temperature	2			
Run Status			2	

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Adult Day Care – Scope of Work

1) Wireless Web-Connected Thermostat AHUs:
Replace the two existing AHU stats with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT. The thermostats and trend data shall be available via a password protected website.

AHU	AI	AO	DI	DO
Space Temperature	2			
Run Status			2	
Electric Heat – 2nd Stage				2

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

2) Boiler Control:
Provide Direct Digital Control on the new boiler, circ pump, and the DHW heater pump. Provide start/stop, status, alarming, and HWS & HWR temp. Implement HW reset control and OAT lockout setpoint.

Boiler Control	AI	AO	DI	DO
Boiler Enable/Disable				1
Boiler Status			1	
Boiler Alarm			1	
Hot Water Pump S/S				1
Hot Water Pump Status			1	
Outside Air Temperature	1			
HWS	1			
HWR	1			
Domestic Hot Water Recirc Pump S/S				1
Domestic Hot Water Recirc Pump Status			1	
Domestic Hot Water Temperature	1			

Honeywell Shall Implement:
- Hot water reset schedule based on OAT.
- OAT boiler lockout.
- Pump control.

- Graphics for boilers and pumps showing proper points and associating alarm points with their respective graphic pages.

Head Start – Scope of Work

1) Upgrade old Network 8000 Building Management System:
Upgrade existing Network 8000 Building Management System to one (1) new Jace AX controller to allow integration into new Building Management System.

Honeywell Shall Implement:
- Install new Jace AX controller to allow existing Invensys controls to be integrated into the new Building Management System.
- New graphics for existing units showing proper points and associating alarm points with their respective graphic pages.

2) AHU CO2 Sensors:
Add one (1) CO2 sensors to each AHU and implement demand controlled ventilation (DCV). Test, adjust and balance (TAB) the Outside Air and Return Air dampers to provide minimum ventilation rates during the occupied mode and check for tight damper close-off during the unoccupied mode.

AHU-1, 2, 3	AI	AO	DI	DO
CO2 Sensor	3			

Honeywell Shall Implement:
- Install CO_2 sensors for DCV on the 3 existing AHUs. – Note there is one (1) conference room associated with AHU-1, this space will have a CO_2 sensor installed. Because this conference room is directly below AHU-1 there will be minimal wiring required.
- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for AC units showing proper points and associating alarm points with their respective graphic pages.

3) Space Push Button Overrides for each AHU:
Provide one (1) push button overrides for each AHU to provide tighter scheduling of equipment.

AHU-1, 2, 3	AI	AO	DI	DO
Override			3	

Honeywell Shall Implement:
- Provide programming to implement push button override.
- Graphics for all push buttons and show override timer on their respective graphic pages.

4) Re-Commissioning:
Re-commission the existing Invensys controls currently installed and confirm economizer control sequence. Perform point to point checkout of existing hard-wired points and testing of existing sequences of operation. Develop a deficiency list of components found to be defective.

Lamagna Activity Center – Scope of Work

1) Boiler Control:
Provide Direct Digital Control on the four (4) boilers, two (2) circ pumps, and the 3-way mixing valve. Provide start/stop, status, alarming, and HWS & HWR temp. Implement HW reset control and OAT lockout setpoint. Provide graphic screens for each piece of equipment on the Building Management System. Note, BMS will handle boiler sequencing.

Boiler Control	AI	AO	DI	DO
Boiler Enable/Disable				4
Boiler Status			4	
Boiler Alarm			4	
Hot Water Pump S/S				2
Hot Water Pump Status			2	
Outside Air Temperature	1			
HWS	4			
3-way Mixing Valve		1		
Common HWS	1			
Common HWR	1			

Honeywell Shall Implement:

- Hot water reset schedule based on OAT reusing existing 3-way valve.
- OAT boiler lockout.
- Pump control.
- Graphics for boilers and pumps showing proper points and associating alarm points with their respective graphic pages.

2) Domestic Hot Water Circulating Pumps:
Provide Direct Digital Control start/stop control of the two DHW circ. pumps.

Boiler Control	AI	AO	DI	DO
Domestic Hot Water Circulating Pump S/S				2
Domestic Hot Water Circulating Pump Status			2	

Honeywell Shall Implement:

- Occupied/Unoccupied schedules as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Heating & Ventilating Units Serving Gym:
Provide Direct Digital Control of the two H&V units that serve the gym. (S/S, status, MAT, SAT, OA/RA damper, htg valve, space temp, CO2 sensor, occupancy sensor, EF S/S and status). Provide and install two (2) new Direct Digital Control 3-way hot water (HW) valves, actuators and new damper actuators. TAB OA/RA dampers, implement DAT control, economizer control, occupancy control and DCV.

Heating & Ventilating Unit (Typical of 2)	AI	AO	DI	DO
Fan S/S				2
Fan Status			2	
Mixed Air Temperature	2			
Supply Air Temperature	2			
OA/RA Damper Actuator		2		
Hot Water Valve Actuator		2		
Space Temperature Sensor	2			
CO2 Sensor	2			
Occupancy Sensor	2			
Exhaust Fan S/S				2
Exhaust Fan Status			2	

Honeywell Shall Implement:

- Provide DAT control, economizer control, and DCV.
- Provide enable/disable control of units based on occupancy sensor.

- Provide new damper actuators and commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Provide new Direct Digital Control 3-way valves for each H&V unit. – Note, new DDC valves will be provided. Piping details will be addressed during detailed design. Work will be scheduled during the summer to avoid HW system shutdown. There is no glycol in the system.
- Lead/Lag units on based on heating/economizer demand of the space.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Air Handling Unit Serving Locker Room:

Provide Direct Digital Control of the one (1) AHU that serves the locker room. (S/S, status, MAT, SAT, OA damper, htg valves, space temp, CO2 sensor, freeze pump S/S and status, EF S/S and status). Provide new damper actuators and TAB for OA/RA Dampers to implement DCV.

Air Handling Unit	**AI**	**AO**	**DI**	**DO**
Fan S/S				1
Fan Status			1	
Mixed Air Temperature	1			
Supply Air Temperature	1			
OA Damper Actuator		1		
Hot Water Valve Actuators		2		
Space Temperature Sensor	1			
CO2 Sensor	1			
Freeze Pump S/S				1
Freeze Pump Status			1	
Exhaust Fan S/S				1
Exhaust Fan Status			1	

Honeywell Shall Implement:

- Provide DAT control, economizer control, and DCV.
- Provide new damper actuators and commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) Direct Digital Control of four (4) Rooftop Units:

Provide full Direct Digital Control of the four RTUs including economizer control and demand controlled ventilation with DAT and space temperature control. Provide new damper actuators, TAB OA/RA dampers.

Rooftop Unit	**AI**	**AO**	**DI**	**DO**
Fan S/S				4
Fan Status			4	
Mixed Air Temperature	4			
Supply Air Temperature	4			
Return Air Temperature	4			
OA/RA Damper Actuator		4		
Hot Water Valve Actuator		4		
DX Cooling Relay	4			
Space Temperature	4			

Honeywell Shall Implement:

- Provide DAT control, space temp control, and economizer control.
- Provide new damper actuators and commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Wireless Web-Connected Thermostats:

Replace the three (3) existing FCU thermostats with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT.

Fan Coil Unit	**AI**	**AO**	**DI**	**DO**
Space Temperature	3			
FCU On/Off				3
FCU Run Status			3	

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Return Air Fans serving RTU-3 & 4:

Provide Direct Digital Control of the two (2) RA fans that serve RTU-3 & RTU-4. (S/S, status, new electronic actuators for two existing by-pass dampers)

Return Fan	**AI**	**AO**	**DI**	**DO**
Fan S/S				2
Fan Status			2	
Bypass Damper Actuators				2

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

8) Exhaust Fans:

Provide Direct Digital Control start/stop control and status of three exhaust fans.

Exhaust Fan	**AI**	**AO**	**DI**	**DO**
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement:

- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

9) Reheat Coil Hot Water Valves:

Provide and install seven (7) new Direct Digital Control 3-way hot water valves on the 1st and 2nd floor reheats and seven space (7) sensors.

Radiation (Typical of 7)	**AI**	**AO**	**DI**	**DO**
Valve Actuator		7		
Space Temperature Sensor	7			

Honeywell Shall Implement:

- Install new Direct Digital Control 3-way hot water valves and Direct Digital Control space sensors to provide room temperature control.
- Occupied/Unoccupied setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

10) Cabinet Unit Heaters:
Provide Direct Digital Control of the three (3) cabinet unit heaters located in the entryways.

Cabinet Unit Heater	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	
Heating Valve				3
Space Temperature	3			

Honeywell Shall Implement:

- Install new sensors and control existing valve.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Central Library – Scope of Work

1) Boiler Control:
Provide Direct Digital Control of the one new hot water boiler and three hot water pumps (S/S, status, boiler alarm, HWS & HWR temp, etc).

Boiler Control	AI	AO	DI	DO
Boiler Enable/Disable				1
Boiler Status			1	
Boiler Alarm			1	
Hot Water Pump S/S				3
Hot Water Pump Status			3	
Outside Air Temperature	1			
HWS	1			
HWR	1			

Honeywell Shall Implement:

- Hot water reset schedule based on OAT.
- OAT boiler lockout.
- Pump control.
- Graphics for boilers and pumps showing proper points and associating alarm points with their respective graphic pages.

2) Domestic Hot Water Circulating Pumps:
Provide Direct Digital Control start/stop control of one (1) DHW circ. pump.

Boiler Control	AI	AO	DI	DO
Domestic Hot Water Circulating Pump S/S				1
Domestic Hot Water Circulating Pump Status			1	

Honeywell Shall Implement:

- Occupied/Unoccupied schedules as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Provide Direct Digital Control of new Air Handling Unit:
Provide Direct Digital Control of the new AHU. (S/S, status, MAT, RAT, SAT, OA/RA damper, htg valve, three (3) DX cooling stages, five (5) VAV dampers, five (5) space temp sensors, five (5) VAV reheat valves, two (2) CO2 sensors, occupancy sensor in the multi-purpose room, EF S/S and status).

Air Handling Unit	**AI**	**AO**	**DI**	**DO**
Fan S/S				1
Fan Status			1	
Mixed Air Temperature	1			
Supply Air Temperature	1			
Return Air Temperature	1			
OA/RA Damper Actuator		1		
Hot Water Valve Actuators		1		
DX Cooling Relay	3			
CO2 Sensor	2			
Occupancy Sensor	1			
Exhaust Fan S/S				1
Exhaust Fan Status			1	

VAV Box	**AI**	**AO**	**DI**	**DO**
Damper		5		
Airflow	5			
Reheat Valve		5		
Space Temperature	5			
Supply Air Temperature	5			

Honeywell Shall Implement:

- Provide DAT control, economizer control, VAV box zone temp control, occupancy sensor control in multi-purpose room and DCV. – Note, one (1) CO_2 sensor will be installed in the multi-purpose room and one (1) CO_2 sensor will be installed in the main space (the building is mostly open floor plan with the exception of the multi-purpose room). TAB the unit and VAV boxes.
- Provide new damper actuators on zone dampers and OA/RA dampers. Commission OA/RA dampers and zone dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Cabinet Unit Heaters:
Provide Direct Digital Control of the three cabinet unit heaters located in the entryways.

Cabinet Unit Heater	**AI**	**AO**	**DI**	**DO**
Fan S/S				3
Fan Status			3	
Heating Valve				3
Space Temperature	3			

Honeywell Shall Implement:

- Install new sensors and control existing valve.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Enfield Senior Center – Scope of Work

1) Replace RTU Carrier DDC System:
The Carrier DDC system will be replaced in-kind with a new control system and it will be integrated it into the existing (web-based) Invensys BMS. Reuse existing conduit, wiring, relays, actuators, valves, and sensors where applicable. Each RTU will have fan S/S, fan status, SAT, MAT, RAT, OA/RA damper, htg stage, cooling stage, space temp, CO2 sensor.

Rooftop Unit	**AI**	**AO**	**DI**	**DO**
Fan S/S				7
Fan Status			7	
Mixed Air Temperature	7			
Supply Air Temperature	7			
Return Air Temperature	7			
OA/RA Damper Actuator		7		
Hot Water Valve Actuator		7		
DX Cooling Relay	14			
RTU-5 Bypass Dampers		2		
RTU-5 Static Pressure	1			
CO2 Sensor	7			
Space Temperature	7			

VAV Box	AI	AO	DI	DO
Damper		8		
Airflow	8			
Space Temperature	8			
Supply Air Temperature	8			

Honeywell Shall Implement:
- Provide DAT control, economizer control, zone temp control, and DCV. TAB OA/RA dampers.
- Provide RTU-5 static pressure control and VAV zone damper control
- Commission OA/RA dampers and zone dampers.
- Graphics for all units showing proper points and associated alarm points with their respective graphic pages.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

2) Boilers and Radiant Floor Hot Water Circulating Pump:
Provide Direct Digital Control start/stop control of the radiant floor heating circ. pump.

Boiler Control	**AI**	**AO**	**DI**	**DO**
Radiant Hot Water Circulating Pump S/S				1
Radiant Hot Water Circulating Pump Status			1	
Boiler Enable/Disable				2
Boiler Status			2	
HWS Temp	1			

Honeywell Shall Implement:
- Occupied/Unoccupied schedules as outlined in the IGA REPORT.
- Control radiant floor heat pump based on space temp from RTU zone.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Department of Public Works – Scope of Work

1) Wireless Web-Connected Thermostats:
Replace the existing thermostats (indicated below) with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT. The thermostat data shall be displayed on a graphic page that is available from the existing Invensys front-end. Existing boiler thermostat control configuration to remain the same.

Thermostats	AI	AO	DI	DO
Garage Space Temperature	3			
Garage Unit On/Off				3
Garage Unit Run Status			3	
Service Bay Space Temperature	3			
Service Bay Unit On/Off				3
Service Bay Unit Run Status			3	
Office Building Finned Tube Radiation				8
Office RTU Space Temperature	1			
Office RTU Unit On/Off				1
Office RTU Run Status			1	
Office Split System Space Temperature	2			
Office Split System On/Off				2
Office Split System Run Status			2	

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

2) Carrier Rooftop Unit Control:
Provide enable/disable control and status of the Carrier RTU located in the new office building.

Rooftop Unit	AI	AO	DI	DO
RTU Enable/Disable				1
RTU Status			1	
Space Temperature	1			

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Hazardville Memorial School – Scope of Work

1) Upgrade Network 8000 Building Management System:
Upgrade old Network 8000 Building Management System to the new JACE AX controller to allow integration into new Building Management System.

Honeywell Shall Implement:
- Install new JACE AX controller to allow existing Invensys controls to be integrated into the new Building Management System.
- New graphics for existing units showing proper points and associating alarm points with their respective graphic pages.

2) Re-commissioning:

Re-commission the existing Invensys controls currently installed, including boilers, library RTU, unit vents, finned tube radiation, cabinet unit heaters, and heat exchangers.

Honeywell Shall Implement:

- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

3) Wireless Pneumatic Direct Digital Control Thermostats:

Provide twenty-seven (27) wireless pneumatic Direct Digital Control thermostats made by Cypress Envirosystems, or approved equal, to control the existing pneumatic 2-way steam valves. Existing control valves are to be reused. Provide and install new air dryer, coalescing filters, and pressure reducing station.

Thermostats	**AI**	**AO**	**DI**	**DO**
Space Temperature	27			
Pneumatic Pressure	27			
Battery Life	27			

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide space temperature control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Thermostatic Radiator Valves:

Provide nine (9) thermostatic radiator valves (TRV) on small misc steam radiators located in closets, bathrooms, entryways, etc.

Honeywell Shall Implement:

- Install TRVs with locking mechanisms on misc. steam radiators and set to 58F.

5) Cafeteria Radiation Valve:

Provide and install one (1) new heating valve for the cafeteria radiation. Reuse the existing Direct Digital Control space sensor to control the new valve.

Radiation	**AI**	**AO**	**DI**	**DO**
Valve Actuator				1

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Unit Ventilators:

Provide Direct Digital Control of the three (3) existing unit ventilators in the gym. Direct Digital Control points include fan S/S and status, SAT, MAT, space temp (with setpoint adj.), 2-way heating valve, OA/RA damper actuator, occupancy sensor, and freezestat.

Unit Ventilator (Typical of 3)	**AI**	**AO**	**DI**	**DO**
Fan S/S				3
Fan Status			3	
Discharge Air Sensor	3			
Mixed Air Temperature	3			
Space Temperature	3			
Space Setpoint Adjust	3			

Unit Ventilator (Typical of 3)	AI	AO	DI	DO
Heating Valve		3		
Occupancy			1	
Outside Air/Return Air Damper Signal		3		
Low Limit Thermostat			3	

Honeywell Shall Implement:

- Provide DAT control, economizer control, and zone temp control.
- Install three (3) new 2-way heating valves and actuators.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Exhaust Fans:
Provide Direct Digital Control start/stop relay control and status of three (3) exhaust fans.

Exhaust Fan (Typical of 3)	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement:

- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

8) Add CO_2 to Library RTU:
Add a CO_2 sensor to the existing RTU that serves the library and provide demand controlled ventilation. TAB OA/RA Dampers.

RTU	AI	AO	DI	DO
Return Air CO_2 Sensor	1			

Honeywell Shall Implement:

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

9) Boiler Run Status:
Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler Run Status	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement:

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Enfield Street School – Scope of Work

1) Re-commissioning:

Re-commission the existing Invensys controls currently installed; including boilers, library and gym RTU, unit vents, finned tube radiation, cabinet unit heaters, and heat exchangers.

Honeywell Shall Implement:
- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Electric (low voltage) Steam Valves:
Provide Direct Digital Control of twenty-five (25) existing 2-way electric (low voltage) steam valves. Provide space temp sensors for each zone to match existing.

Radiation	AI	AO	DI	DO
Valve Actuator				25
Space Temperature	25			

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Thermostatic Radiator Valves:
Provide and install seven (7) thermostatic radiator valves (TRV) on small misc steam radiators located in closets, bathrooms, entryways, etc.

Honeywell Shall Implement:
- Install TRVs with locking mechanisms on misc. steam radiators and set to 58F.

4) Existing Unit Vents:
Connect the six (6) existing unit vents in the 1963 section to the new Building Management System and provide graphics. Reuse existing valves and actuators.

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) Existing Pneumatic Hot Water Valves:
Provide Direct Digital Control of the 3 existing 2-way pneumatic hot water valves in the 1963 section. Retrofit the existing valves with new Direct Digital Control actuators and provide three (3) Direct Digital Control space sensors (adj.).

Radiation	AI	AO	DI	DO
Valve Actuator				3
Space Temperature	3			
Space Setpoint Adjust	3			

Honeywell Shall Implement:
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) H&V Unit serving Cafeteria:
Provide Direct Digital Control of the H&V unit in the attic that serves the cafeteria. Direct Digital Control points will include fan S/S and status, SAT, MAT, space temp (with setpoint adj.), (2) 2-way heating valves (use existing actuators), OA/RA damper actuator (use existing actuators), CO2 sensor, occupancy sensor, and freezestat.

Provide DCV, DAT, economizer and zone temperature control. TAB OA/RA dampers. Existing control valves and actuators will be reused.

H&V Unit	AI	AO	DI	DO
Fan S/S				1
Fan Status			1	
Discharge Air Sensor	1			
Mixed Air Temperature	1			
Space Temperature	1			
Space Setpoint Adjust	1			
Heating Valve		2		
Outside Air/Return Air Damper		1		
CO2 Sensor	1			
Occupancy Sensor			1	
Low Limit Thermostat			3	

Honeywell Shall Implement:

- Provide DAT control, economizer control, zone temp control, and DCV.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Cabinet Unit Heaters:

Provide Direct Digital Control of six (6) cabinet unit heaters located throughout the entryways and corridors. Provide new thermostat and actuator, existing control valves will be reused

Cabinet Unit Heater	AI	AO	DI	DO
Fan S/S				6
Fan Status			6	
Heating Valve				6
Space Temperature	6			

Honeywell Shall Implement:

- Install new sensors and control existing valve.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

8) Exhaust Fans:

Provide Direct Digital Control start/stop control and status of three (3) exhaust fans.

Exhaust Fan (Typical of 3)	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement:

- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

9) Add CO2 to RTU serving Library and Gymnasium:

Add a CO2 sensor to the existing RTUs that serve the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU (Typical of 2)	AI	AO	DI	DO
CO2 Sensor	2			

Honeywell Shall Implement:

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

10) Boiler Run Status:

Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement:

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Thomas Alcorn School – Scope of Work

1) Re-commissioning:

Re-commission the existing Invensys controls currently installed; including boilers, heat exchanger and pumps.

Honeywell Shall Implement:

- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Existing Pneumatic Hot Water Valves:

Provide Direct Digital Control of the three existing 2-way pneumatic hot water valves. Provide space temp sensors for each zone to match existing. Reuse existing valves.

Radiation	AI	AO	DI	DO
Valve Actuator		3		
Space Temperature	3			

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Existing Pneumatic Steam Valves:

Provide Direct Digital Control of the thirty-six (36) existing 2-way pneumatic steam valves. Retrofit the existing valves with new Direct Digital Control actuators and provide 36 Direct Digital Control space temp sensors for each zone to match existing.

Radiation	AI	AO	DI	DO
Valve Actuator				36
Space Temperature	36			

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.

- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Thermostatic Radiator Valves:

Provide and install eight (8) thermostatic radiator valves (TRV) on small misc steam radiators located in closets, bathrooms, entryways, etc.

Honeywell Shall Implement:

- Install TRVs with locking mechanisms on misc. steam radiators and set to 58F.

5) Cafeteria AHU-1:

Provide Direct Digital Control of the cafeteria AHU-1 and connect to the new Building Management System. Direct Digital Control points will include supply fan S/S and status, return fan S/S and status, SAT, MAT, RAT, space temp (with setpoint adj.), 3-way heating valve (retrofit existing valves with Direct Digital Control actuators), freeze protection pump S/S and status, DCV, OA/RA/EA damper actuators, CO2 sensor, occupancy sensor, and freezestat. TAB OA/RA dampers.

AHU-1	AI	AO	DI	DO
Fan S/S				1
Fan Status			1	
Discharge Air Sensor	1			
Return Fan S/S				1
Return Fan Status			1	
Mixed Air Temperature	1			
Supply Air Temperature	1			
Return Air Temperature	1			
Space Temperature	1			
Space Setpoint Adjust	1			
3-way Heating Valve		1		
Freeze Pump S/S				1
Freeze Pump Status			1	
Outside/Return Air Damper		1		
CO2 Sensor	1			
Occupancy Sensor			1	
Low Limit Thermostat			1	

Honeywell Shall Implement:

- Provide DAT control, economizer control, zone temp control, and DCV.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Gymnasium AHU-2:

Provide Direct Digital Control of the gym AHU-2 and connect to the new Building Management System. Retrofit existing three-way heating valve with Direct Digital Control actuator. Provide DAT control, economizer control, zone temp control, and DCV. TAB OA/RA dampers. Direct Digital Control points will include supply fan S/S and status, SAT (after each reheat coil), RAT, space temp (with setpoint adj.), (2) 3-way heating valves (retrofit existing valves with Direct Digital Control actuators), OA/RA/EA damper actuators, (2) freeze protection pumps S/S and status, CO2 sensor, occupancy sensor, and freezestat.

AHU-2	AI	AO	DI	DO
Fan S/S				1

AHU-2	AI	AO	DI	DO
Fan Status			1	
Discharge Air Sensor	2			
Return Air Temperature	1			
Space Temperature	1			
Space Setpoint Adjust	1			
3-way Heating Valve		2		
Freeze Pump S/S				1
Freeze Pump Status			1	
Outside/Return Air Damper		1		
CO2 Sensor	1			
Occupancy Sensor			1	
Low Limit Thermostat			1	

Honeywell Shall Implement:

- Provide DAT control, economizer control, zone temp control, and DCV.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Wireless Web-Connected Thermostat AHU-3:

Replace the existing AHU-3 thermostat with a wireless web-connected thermostat that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT. The thermostat data shall be displayed on a graphic page that is available through the new Invensys Building Management System.

AHU-3	AI	AO	DI	DO
Space Temperature	1			
Run Status			1	

Honeywell Shall Implement:

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

8) Classroom Unit Ventilators:

Retrofit the eleven (11) existing classroom unit vents in the new section of the building with new Direct Digital Control. Direct Digital Control points will include supply fan S/S and status, SAT, MAT, space temp (with setpoint adj.), 2-way heating valves (retrofit existing valves with Direct Digital Control actuators), OA/RA damper actuator, and freezestat. Five of the unit vents have associated 2-way heating valves (retrofit existing valves with Direct Digital Control actuators). The 10 ceiling mounted Carrier cassette type A/C units that provide cooling to the spaces will be controlled by the new unit vent Direct Digital Control space sensor. Provide Direct Digital Control to control Carrier cassette type A/C units.

Unit Ventilator (Typical of 11)	AI	AO	DI	DO
Fan S/S				11
Fan Status			11	
Discharge Air Sensor	11			
Mixed Air Temperature	11			
Space Temperature	11			
Space Setpoint Adjust	11			
Heating Valve		11		

Unit Ventilator (Typical of 11)	AI	AO	DI	DO
Outside Air/Return Air Damper		11		
Low Limit Thermostat			11	
Cooling Relay				11

Honeywell Shall Implement:

- Provide DAT control, economizer control, and zone temp control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Lockout Carrier cassette units during unit vent economizer mode, heating mode, and unoccupied periods. – Note, five (5) of the rooms have additional 2-way valves on the finned tube radiation; these will be controlled on the same output as the valve in the unit ventilator. The A/C cassette units will be locked out when the heat is active but will operate under their own thermostat otherwise.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

9) Chiller Enable/Disable:

Provide Direct Digital Control enable/disable control of the existing chiller. Provide Direct Digital Control CHW supply & return temp and connect to the new Building Management System.

Chiller	AI	AO	DI	DO
Enable/Disable				1
CHWS Temperature	1			
CHWR Temperature	1			

Honeywell Shall Implement:

- Enable/disable control of the chiller based on outside air lockout setpoint.
- Chilled water available signal to all associated cooling equipment.
- Graphics for units showing proper points, setpoints, and associating alarm points with their respective graphic pages

10) Replace JCI Controls on RTU-1 and RTU-2:

Replace the JCI controls on RTU-1 and RTU-2. Provide Direct Digital Control space sensors and zone damper control to match existing. Direct Digital Control points will include supply fan S/S and status, SAT, MAT, RAT, 2 stages of gas heat, 3 stages of DX cooling (6) space temps (with setpoint adj.), (6) zone dampers, by-pass damper, OA/RA damper actuators, CO2 sensors. Implement DCV, DAT, economizer and zone temperature control. TAB OA/RA. Reuse existing wiring and sensors as needed.

Rooftop Unit	AI	AO	DI	DO
Fan S/S				2
Fan Status			2	
Mixed Air Temperature	2			
Supply Air Temperature	2			
Return Air Temperature	2			
OA/RA Damper Actuator		2		
Zone Dampers		12		
By-pass Damper		1		
Gas Heat		4		
DX Cooling Relay	6			
CO2 Sensor	2			
Space Temperature	2			

Honeywell Shall Implement:

- Provide DAT control, economizer control, zone temp control, and DCV.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Commission OA/RA dampers. – Note, work includes testing and adjusting linkages as necessary to provide tight close-off of dampers modulated in both directions. Customer will be notified if dampers need replacement.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

11) Boiler Run Status:
Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement
- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Harriet Beecher Stowe School – Scope of Work

1) Re-commissioning:
Re-commission the existing Invensys controls currently installed; including boilers, heat exchanger and pumps.

Honeywell Shall Implement
- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Existing 3-way Valves in Boiler Room:
Provide new Direct Digital Control actuators for the two (2) existing 3-way valves in the boiler room and implement an OAT reset schedule for the leaving hot water supply temp for each zone.

Radiation	AI	AO	DI	DO
Valve Actuator		2		
HWS Temperature	2			

Honeywell Shall Implement
- Provide and install new Direct Digital Control actuator and provide hot water reset based on the outside air temp.
- Graphics for units showing proper points, setpoints, and associating alarm points with their respective graphic pages.

3) Hot Water Radiation Zones:
Provide and install six (6) new Direct Digital Control 2-way hot water valves on the existing finned tube radiation in the office corridor rooms. Provide space temp sensors (adj.) for each new Direct Digital Control valve.

Radiation	AI	AO	DI	DO
Valve Actuator				6
Space Temperature	6			
Space Temperature Setpoint Adjust	6			

Honeywell Shall Implement
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Thermostatic Radiator Valves:

Provide and install four (4) stand-alone thermostatic radiator valves (TRVs) on the existing finned tube radiation in the bathrooms.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on finned tube radiation and set to 58F.

5) Add CO2 and Occupancy Sensor to RTU/MAU:

Add a total of three (3) CO2 sensors and two (2) space occupancy sensors (gym and café only) to the existing RTU/MAU that serves the library, cafeteria, and gym and provide demand controlled ventilation. TAB OA/RA Dampers.

RTU/MAU	AI	AO	DI	DO
Occupancy Sensor			2	
CO2 Sensor	3			

Honeywell Shall Implement

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Boiler Run Status:

Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Henry Barnard School – Scope of Work

1) Re-commissioning:

Re-commission the existing Invensys controls currently installed; including boilers, library and gym RTU, unit vents, finned tube radiation, and cabinet unit heaters.

Honeywell Shall Implement

- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Pneumatic Hot Water Valves:

Provide Direct Digital Control of the five (5) existing 2-way pneumatic hot water valves. Retrofit the existing valves with new Direct Digital Control actuators and provide five Direct Digital Control space temp sensors for each zone to match existing

Radiation	AI	AO	DI	DO
Valve Actuator		5		
HWS Temperature	5			

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

3) Exhaust Fans:
Provide Direct Digital Control start/stop control and status of three (3) exhaust fans.

Exhaust Fan (Typical of 3)	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement
- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

4) Existing Electric Valve:
Provide Direct Digital Control of the one (1) existing electric stand-alone valve on the cafeteria finned tube radiation and provide a Direct Digital Control space sensor to provide temperature control of the space.

Radiation	AI	AO	DI	DO
Valve Actuator		1		
Space Temperature	1			

Honeywell Shall Implement
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) Add CO2 and Occupancy Sensor to two (2) RTU/MAU:
Add a total of two (2) CO2 sensor and one (1) space occupancy sensor (gym only) to the existing RTU/MAU that serves the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU/MAU	AI	AO	DI	DO
Occupancy Sensor			1	
CO2 Sensor	2			

Honeywell Shall Implement
- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Wireless Web-Connected Thermostats:
Replace the six (6) existing thermostats in the admin office area that control the Lennox furnaces and one existing thermostat that controls the AHU in the main office area with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the IGA REPORT. The thermostat data shall be displayed on a graphic page that is available from the existing Invensys Building Management System.

Furnaces and AHU	AI	AO	DI	DO
Space Temperature	7			
Run Status			7	

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Boiler Run Status:
Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement
- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Eli Whitney School – Scope of Work

1) Upgrade Network 8000 Building Management System:
Upgrade old Network 8000 Building Management System to the new JACE AX controller to allow integration into new Building Management System.

Honeywell Shall Implement
- Install new JACE AX controller to allow existing Invensys controls to be integrated into the new Building Management System.
- New graphics for existing units showing proper points and associating alarm points with their respective graphic pages.

2) Re-Commissioning:
Re-commission the existing Invensys controls currently installed; including boilers, library and gym RTU, unit vents, finned tube radiation, and cabinet unit heaters.

Honeywell Shall Implement
- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

3) Existing Electric Valve:
Provide Direct Digital Control of the one (1) existing stand-alone electric valve on the cafeteria finned tube radiation and provide a Direct Digital Control space sensor to provide temperature control of the space.

Radiation	AI	AO	DI	DO
Valve Actuator		1		
HWS Temperature	1			

Honeywell Shall Implement
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

4) Add CO2 and Occupancy Sensor to RTU/MAU:
Add two (2) CO2 sensors and a space occupancy sensor (gym only) to the existing RTU/MAU that serves the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU/MAU	AI	AO	DI	DO
Occupancy Sensor			1	
CO2 Sensor	2			

Honeywell Shall Implement

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) PTAC Control:

Provide Direct Digital Control of the two (2) PTAC units in the main office area.

PTAC	AI	AO	DI	DO
Space Temperature	2			
Enable/Disable				2

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

6) Thermostatic Radiator Valves:

Provide five (5) stand-alone thermostatic radiator valves (TRV) on small misc hot water radiators located in four (4) bathrooms and one closet.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on misc. radiators and set to 58F.

7) Boiler Run Status:

Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Prudence Crandall School – Scope of Work

1) Re-Commissioning:

Re-commission the existing Invensys controls currently installed; including boilers, library RTU, gym MAU, unit vents, finned tube radiation, and cabinet unit heaters.

Honeywell Shall Implement

- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Existing Pneumatic Hot Water Valves:

Provide Direct Digital Control of the eight (8) existing 2-way pneumatic hot water valves. Retrofit the existing valves with new Direct Digital Control actuators and provide eight Direct Digital Control space temp sensors for each zone to match existing.

Radiation	AI	AO	DI	DO
Valve Actuator		8		
HWS Temperature	8			

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

3) Thermostatic Radiator Valves:

Provide four (4) thermostatic radiator valves (TRV) on small misc hot water radiators located in bathrooms and closet areas.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on misc. radiators and set to 58F.

4) Thermostatic Radiator Valves:

Provide ten (10) thermostatic radiator valves (TRV) on cabinet unit heaters located throughout the entryways and corridors.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on misc. radiators and set to 58F.

5) Exhaust Fans:

Provide Direct Digital Control start/stop control and status of three (3) exhaust fans.

Exhaust Fan (Typical of 3)	**AI**	**AO**	**DI**	**DO**
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement

- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

6) Add CO2 and Occupancy Sensor to RTU/MAU:

Add two (2) CO2 sensors and one (1) space occupancy sensor (gym only) to the existing RTU/MAU that serves the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU/MAU	**AI**	**AO**	**DI**	**DO**
Occupancy Sensor			1	
CO2 Sensor	2			

Honeywell Shall Implement

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) Wireless Web-Connected Thermostats:

Replace the two (2) existing thermostats in the main office area that control the fan coil units with wireless web-connected thermostats that display, record, and archive space temp and equipment run status. Program the thermostats with a 7-day schedule with occupied and unoccupied heating and cooling setpoints per the spec. The thermostat data shall be displayed on a graphic page that is available from the existing Invensys Building Management System.

Furnaces and AHU	**AI**	**AO**	**DI**	**DO**
Space Temperature	2			
Run Status			2	

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

8) Boiler Run Status:

Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Nathan Hale School – Scope of Work

1) Re-Commissioning:

Re-commission the existing Invensys controls currently installed; including boilers, library RTU, gym MAU, unit vents, finned tube radiation, and cabinet unit heaters.

Honeywell Shall Implement

- Point to point checkout of existing hard-wired points.
- Functional testing of existing sequences of operation.
- Develop a deficiency list of components found to be defective.

2) Existing Pneumatic Hot Water Valves:

Provide Direct Digital Control of the seven existing 2-way pneumatic hot water valves. Retrofit the existing valves with new Direct Digital Control actuators and provide seven (7) Direct Digital Control space temp sensors for each zone to match existing.

Radiation	AI	AO	DI	DO
Valve Actuator		7		
HWS Temperature	7			

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

3) Thermostatic Radiator Valves:

Provide four (4) thermostatic stand-alone radiator valves (TRVs) on existing cabinet unit heaters in the corridors.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on cabinet unit heaters and set to 58F.

4) Add CO2 and Occupancy Sensor to RTU/MAU:

Add two (2) CO2 sensors and a space occupancy sensor (gym only) to the existing RTU/MAU that serves the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU/MAU	AI	AO	DI	DO
Occupancy Sensor			1	
CO2 Sensor	2			

Honeywell Shall Implement

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.

- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) Boiler Run Status:
Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement
- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Edgar Parkman School – Scope of Work

1) Upgrade Network 8000 Building Management System:
Upgrade old Network 8000 Building Management System to the new JACE AX controller to allow integration into new Building Management System.

Honeywell Shall Implement
- Install new JACE AX controller to allow existing Invensys controls to be integrated into the new Building Management System.
- New graphics for existing units showing proper points and associating alarm points with their respective graphic pages.

2) Re-Commissioning:
Re-commission the existing Invensys controls currently installed; including boilers, library and gym RTU, unit vents, finned tube radiation, and cabinet unit heaters. Perform point to point checkout of existing hard-wired points and testing of existing sequences of operation. Develop a deficiency list of components found to be defective.

3) Existing Pneumatic Hot Water Valves:
Provide Direct Digital Control of the five (5) existing 2-way pneumatic hot water valves. Retrofit the existing valves with new Direct Digital Control actuators and provide five (5) Direct Digital Control space temp sensors for each zone to match existing.

Radiation	AI	AO	DI	DO
Valve Actuator		5		
Space Temperature	5			

Honeywell Shall Implement
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

4) Exhaust Fans:
Provide Direct Digital Control start/stop control and status of three (3) exhaust fans.

Exhaust Fan (Typical of 3)	AI	AO	DI	DO
Fan S/S				3
Fan Status			3	

Honeywell Shall Implement
- Install new relays to provide start/stop control.
- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.

- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

5) Existing Electric Valve:

Provide Direct Digital Control of the one (1) existing stand-alone electric valve on the cafeteria finned tube radiation and provide a Direct Digital Control space sensor to provide temperature control of the space.

Radiation	AI	AO	DI	DO
Valve Actuator		1		
HWS Temperature	1			

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

6) Add CO2 and Occupancy Sensor to RTU/MAU:

Add two (2) CO2 sensors and one (1) space occupancy sensor (gym only) to the existing RTU/MAU that serves the library and gym and provide demand controlled ventilation. TAB OA/RA dampers.

RTU/MAU	AI	AO	DI	DO
Occupancy Sensor			1	
CO2 Sensor	2			

Honeywell Shall Implement

- Provide programming to implement DCV. Verify that the OA damper is providing minimum ventilation rates during the occupied mode and provides tight damper close-off during the unoccupied mode.
- Provide programming to implement night setback control of unit based on occupancy sensor detection.
- Exercise and make necessary OA/RA damper linkage adjustments.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

7) PTAC Control:

Provide Direct Digital Control of the two (2) PTAC units in the main office area.

Unit Ventilator	AI	AO	DI	DO
Space Temperature	2			
Enable/Disable				2

Honeywell Shall Implement

- Occupied/Unoccupied schedules and setpoints as outlined in the IGA REPORT.
- Provide night setback and space temp control.

8) Thermostatic Radiator Valves:

Provide and install nine (9) stand-alone TRVs on the existing nine (9) hot water cabinet unit heaters in the corridors and finned tube radiation in misc closets and bathrooms.

Honeywell Shall Implement

- Install TRVs with locking mechanisms on misc. radiators and set to 58F.

9) Boiler Run Status:

Add Direct Digital Control boiler run status to both boilers and connect to the existing Invensys Building Management System.

Boiler	AI	AO	DI	DO
Status			2	

Honeywell Shall Implement

- Provide boiler run status.
- Graphics for units showing proper points and associating alarm points with their respective graphic pages.

Building Management System Retro-Commissioning:

Retro-commissioning (RCx) is the systematic process of verifying that the existing Invensys Building Management System (BMS) is performing in accordance with the original design documents and overall basis of design. The RCx plan below outlines the commissioning process for verifying the operations and performance of the existing BMS. The table below details the proposed RCx activities for the existing Invensys BMS:

Buildings Included in this Scope of Work
Head Start
Hazardville Memorial School
Enfield Street School
Thomas Alcorn School
Harriet Beecher Stowe School
Henry Barnard School
Eli Whitney School
Prudence Crandall School
Nathan Hale School
Edgar Parkman School

For details on the existing Invensys controls and the various pieces of equipment associated with the RCx scope, please see individual building sections listed in ECM 5.

Scope of Work

1) Perform pre-functional inspections
2) Perform point-to-point checkout
3) Verification of sequences of operation
4) Implementation of occupancy schedules
5) Functional testing of end devices
6) Review of front end graphic screens for accuracy
7) Development of a deficiency list

Notes:

a) Honeywell has carried a $100,000 allowance to correct mechanical deficiencies identified during the RCx process (i.e. replacement of damaged dampers, actuators, valves, etc.)

Demand Control Ventilation – Fan Variable Frequency Drives:

The following fans will have variable frequency drives (VFDs) installed on their fans as part of demand control ventilation implementation:

Building	Location Served	Supply Fan Motor HP	Return Fan Motor HP	Install VFD(s) (Y/N)
Nathan Hale School	Cafeteria	7.5	-	Y
Thomas Alcorn School	Gymnasium	5.0	3.0	Y
Harriet Beecher Stowe School	Cafeteria	5.0	-	Y
Head Start	Classrooms	5.0	5.0	Y

Scope of Work

1) Furnish and install VFDs on the fan motors listed in the table above
2) Existing motors are inverter duty and shall be reused. No motor replacements or repairs are included.
3) Furnish and install all power and control wiring
4) Integrate VFDs into the building automation system
5) Start up, test and commission

ESM #6: Building Envelope Improvements

Summary of facilities included for Building Envelope Improvements:

LOCATION	
School Facilities	Town Facilities
Emergency Medical services	
Eli Whitney School	Enfield Senior Center
Hazardville Memorial School	Pearl Street Library
Nathan Hale School	Central Library
Henry Barnard School	Lamagna Activity Center
Edgar Parkman School	Enfield Town Hall
Prudence Crandall School	Department of Public Works
Enfield Street School	Enfield Police Department
Thomas Alcorn School	Adult Day Care
Harriet Beecher Stowe School	Family Resource Center
Head Start School	Buildings and Grounds

Table A-6

Scope of Work

1) Honeywell shall provide all equipment, materials and labor to implement the Building Envelope Improvements project as specified in the IGA REPORT Exhibit 18.
2) Upon completion of work verify door alignment with frame, ensure proper door closure, through adjustment only, and verify no significant gaps between doors and frames.
3) No interior doors are included.
4) No painting, patching, door, door operator, or floor repair or replacement is included.

ESM #7: Water Conservation

Table A-7 summarizes the Facilities included for this measure:

LOCATION	
School Facilities	**Town Facilities**
Emergency Medical services	
Eli Whitney School	Enfield Senior Center
Hazardville Memorial School	Pearl Street Library
Nathan Hale School	Central Library
Henry Barnard School	Angelo Lamagna Activity Center
Edgar Parkman School	Enfield Town Hall
Prudence Crandall School	Department of Public Works
Enfield Street School	Enfield Police Department
Thomas Alcorn School	Adult Day Care
Harriet Beecher Stowe School	Family Resource Center
Head Start School	

Table A-7

Scope of Work

1) Honeywell shall provide all equipment, materials, and labor to implement the water conservation project in accordance with the IGA REPORT Exhibit 7.
2) Toilet Upgrades Summary:
    a) Commercial flush valve toilets will be replaced with new American Standard Madera FloWise flushmeter valve toilets or approved equal. Gravity tank toilets will be replaced with new American Standard Cadet 3 FloWise gravity toilets or equivalent. Toilets to be outfitted with new Centoco (or equivalent) commercial open front plastic seats (white color), less cover.
    b) If a handicap accessible stall with hand rails has been installed to modify an existing bathroom for ADA compliance and the toilet is not at ADA height, we will attempt to make the toilet in this stall meet ADA guidelines. To accomplish this, floor mounted ADA toilets will replaced with new ADA height toilets.
    c) New toilets will be installed with new control stop valves or angle stop valves.
    d) All toilet bowls will be securely connected to water supply lines and waste connections. Minor repairs to floor mount toilet flanges will be made to ensure secure toilet bowl connections. Floor mount toilet flanges will be repaired as needed with a repair anchor flange, Cast Iron Flange Repair Ring anchored to the floor with 4 tap-con bolts or spanner flanges
    e) Minor repairs to water supply connections include replacement of 1" horizontal water lines, as required, to rough plumb flush valves when installing new toilet bowls. All piping modifications will be made with material that complies with standard trade practice and like to existing materials.
3) Urinal Upgrades Summary:
    a) Flush valves will be installed to the minimum required height of 6" above the flood plain (urinal rim) as required by plumbing code
    b) All new urinal valves will be installed with new control stop valves
4) Faucets shall be upgraded with tamper-proof aerators
5) Broken carriers and carrier bolts are not included for replacement.
6) Painting, tile work, and wall repair is not included.
7) The Customer shall be responsible to locate and turn off isolation valves prior to starting work in each building.
8) Honeywell shall provide a proposal for any work not included at the request of the Customer.

Notes:

a) The Town will be notified of any issues encountered during installation.

ESM #8: ECM Deleted

ESM #9: Desktop Computer Power Management

Install a centralized personal computer power management system. The Surveyor software by Verdiem enables centralized control of desktop computer operation throughout the District and Town facilities.

LOCATION		
Building	**# of Administrative Computers**	**# of Student Computers**
Emergency Medical Services	9	-
Enfield Senior Center	23	-
Pearl Street Library	2	-
Central Library	20	-
Lamagna Activity Center	16	-
Enfield Town Hall	69	-
Department of Public Works	44	-
Adult Day Care	6	-
Family Resource Center	7	-
Buildings and Grounds	5	-
Eli Whitney School	-	71
Hazardville Memorial School	-	28
Nathan Hale School	-	59
Henry Barnard School	-	69
Edgar Parkman School	-	65
Prudence Crandall School	-	71
Enfield Street School	-	65
Thomas Alcorn School	-	50
Harriet Beecher Stowe School	-	60
Head Start	-	9
Total	**201**	**547**

Table A-9

Scope of Work

1) Provide Seven Hundred Forty Eight (748) licenses for Verdiem Surveyor software or equivalent for desktop computer power management as detailed in the table above. Honeywell will provide technical assistance to expedite the installation of the new software. The Town will install the software and push it down to the end-user machines.
2) Start-up, test and commission.
3) Maintenance, including full tech support and product upgrades for one (1) year on Surveyor software. Town to work directly with Verdiem (or equal software firm) on any on-going support, maintenance issue, or software upgrade during this period.
4) Town to purchase from and coordinate with Verdiem all updates from years 2 through 15

ESM #10: Computer Peripheral Power Management

Building	Qty of Power Strips	Qty of Charging Stations
Eli Whitney School	34	3

Building	Qty of Power Strips	Qty of Charging Stations
Hazardville Memorial School	28	2
Nathan Hale School	25	2
Henry Barnard School	44	2
Edgar Parkman School	32	3
Prudence Crandall School	31	3
Enfield Street School	25	3
Thomas Alcorn School	16	-
Harriet Beecher Stowe School	24	-
Total	**259**	**18**

Table A-10

Scope of Work

1. Provide only Two Hundred Fifty Nine (259) power strips for classroom computers, monitors, and locally connected printers
2. Provide only Eighteen (18) power charging stations for laptop and iPad charging carts.
3. Customer shall install Two Hundred Fifty Nine (259) power strips and Eighteen (18) power charging stations as detailed in Table A-10.

ESM #11: Plug Load Power Management

Building	# of Units
Eli Whitney School	34
Hazardville Memorial School	20
Nathan Hale School	3
Henry Barnard School	5
Edgar Parkman School	3
Prudence Crandall School	35
Enfield Street School	16
Thomas Alcorn School	1
Harriet Beecher Stowe School	6
Total	**123**

Table A-11

Scope of Work

1) Furnish only One Hundred Twenty Three (123) BERT or approved equal Wi-Fi programmable timers to turn off Window Air Conditioning Units during unoccupied periods as detailed in the table above.
2) Customer shall provide an accessible wi-fi network configuration for the plugs
3) Customer shall install One Hundred Twenty Three (123) BERT, or equivalent Wi-Fi programmable timers per Table A-11 and configure on network.
4) Honeywell will provide technical assistance to expedite the installation of the new software.

ESM #12: Pipe Insulation

Insulation Thickness Recommendations		
Pipe Diameter	**Insulation Type**	**Recommended Insulation Thickness**
1.5 Inch and lower	Fiberglass	1.5”
2 Inch to 5 Inch	Fiberglass	2”
5 Inch and above	Fiberglass	2-1/2”

Table A-12.1

Scope of Work

1) Insulate heating hot water, steam, steam condensate, and domestic hot water piping quantities with appropriate insulation thicknesses as indicated in the tables above
2) Honeywell shall provide all equipment, materials and labor to insulate existing heating hot water, steam, steam condensate, and domestic hot water piping as specified in the IGA REPORT Exhibit 8 (excluding work at JFK Middle school) .
3) Any pipe insulation not identified on the IGA REPORT Pipe Insulation Line by Line excluded. Honeywell shall provide a proposal for any work not included at the request of Customer.
4) Repair or replacement of existing pipe insulation is not included.
5) Insulation jackets on equipment included shall match existing pipe insulation in appearance.

Notes:

a) Insulation jackets will match existing appearance
b) Pipe insulation work is confined to boiler and mechanical rooms.